

# BW Threat & Vulnerability

Dr. F. Prescott Ward  
Midwest Research Institute

Phone: (407) 953-3060

FAX: (407) 953-6742

e-mail:fpward@msn.com



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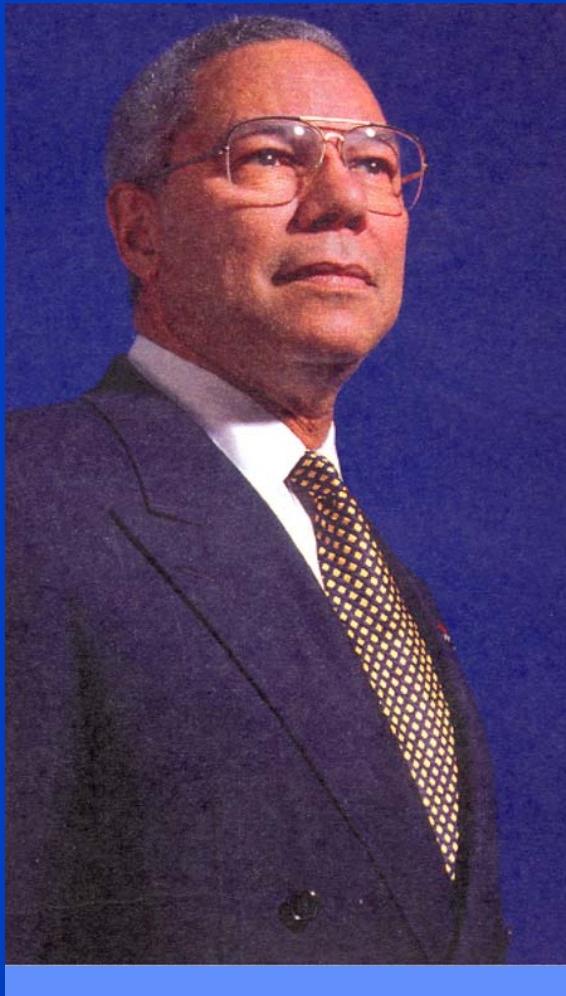
# BW Threat and Vulnerability

## Briefing Outline

- BW Exploitation
- Area Coverage
- Threat Agents and Delivery Systems
- Differences between BW and CW
- Countermeasures



# Biological Warfare Threat



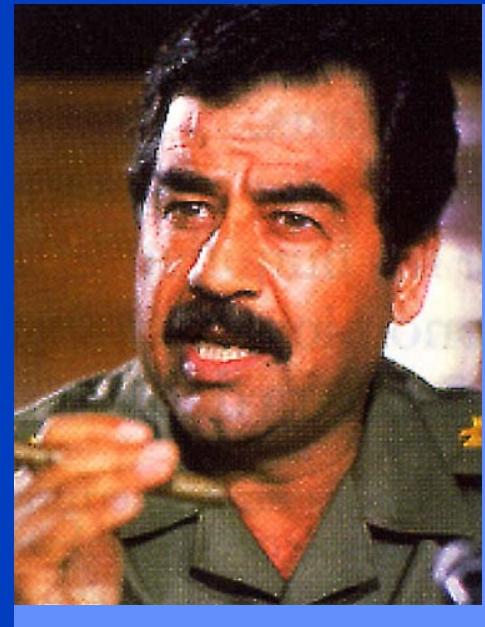
*"The one that scares me to death perhaps even more so than tactical nuclear weapons, the one we have less capability against, is biological weapons. And this was my greatest concern during Operation Desert Storm, knowing that the Iraqis had been working on such a capability."*

General Colin Powell  
Chairman, JCS  
Testimony to House Armed Services Committee  
30 March 1993

# Biological Warfare Threats

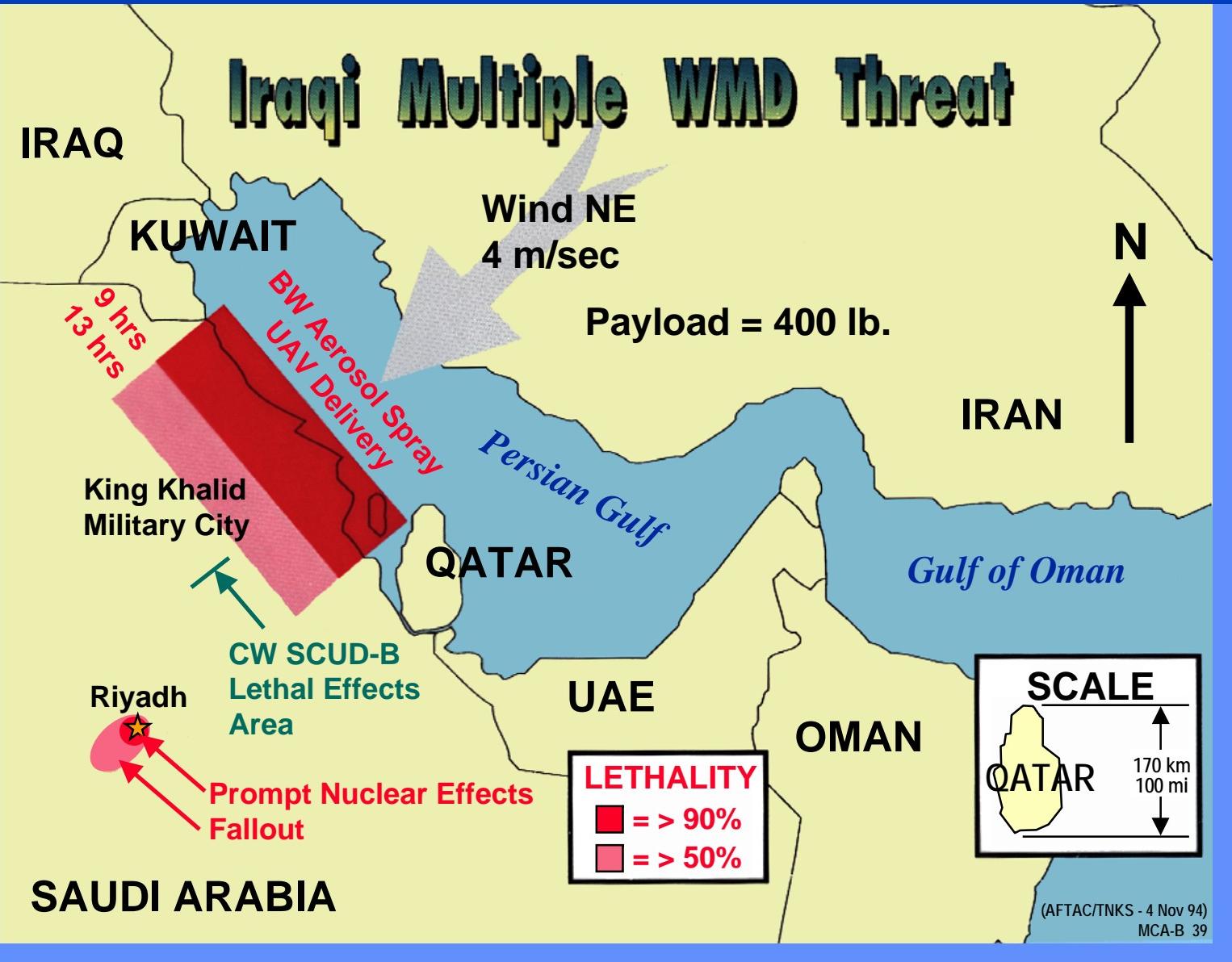
## Reasons to Exploit BW

- Military options diminishing
- Formidable deterrence value
- U.S. vulnerable
- Massive casualties over huge area
- Plausible denial of use
- Cheap, available industrial base, easy to disseminate



## Iraqi BW Threat

- Huge stockpile
- Weaponized
- Verified by UNSCOM



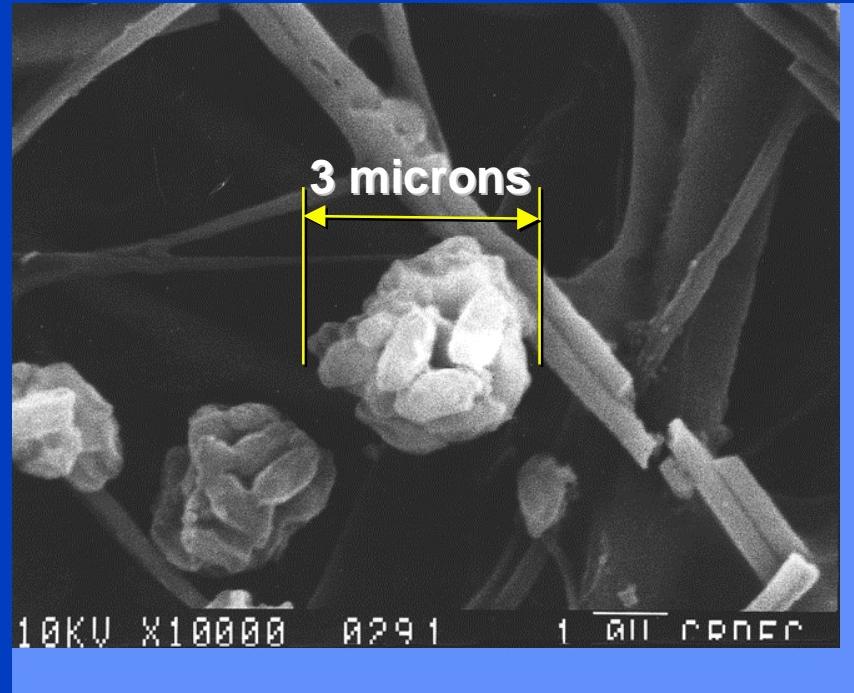
# Threat List

## Bacteria

- Anthrax
- Plague
- Tularemia
- Brucellosis

## Toxins

- Botulism
- Ricin



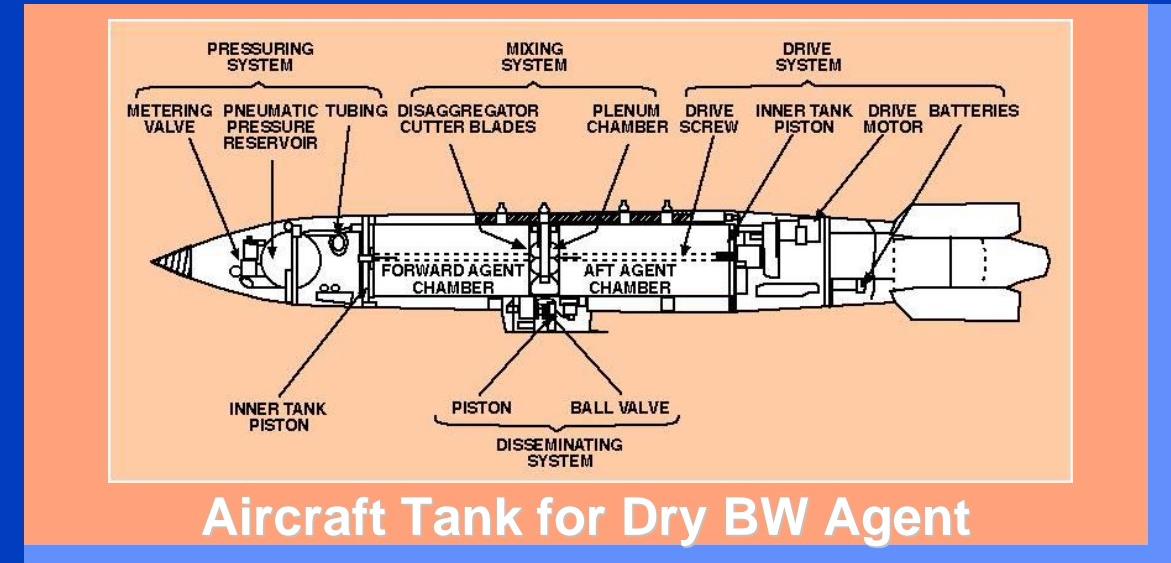
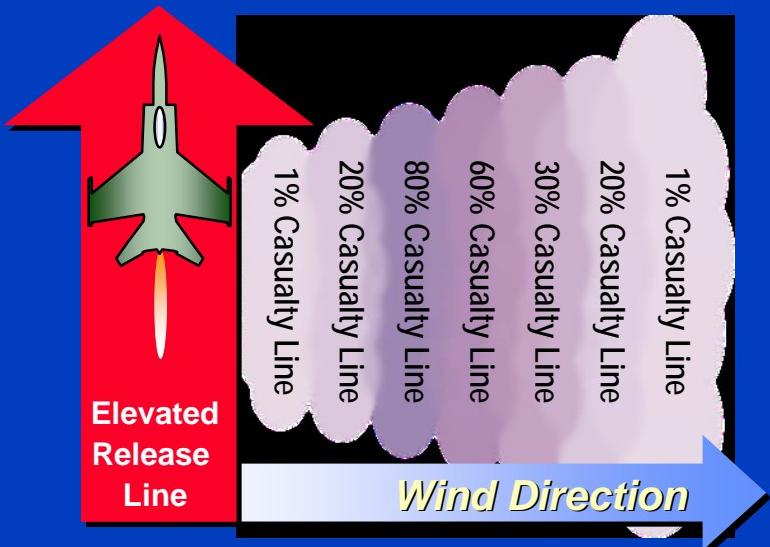
## Viruses

- Smallpox
- Ebola
- Marburg
- Equine encephalitis

# Enemy BW Delivery Systems

## Spray Tanks Cruise Missiles

Low altitude,  
line-source delivery  
of wet or dry BW agents



## Threat

- Large coverage area
- Very high dissemination efficiencies
- Cruise missiles difficult to intercept

# BW Delivery Options



## Agricultural sprayers

- Widely available
- Relatively inexpensive
- High dissemination efficiency



## Iraqi exploitation

- Purchased several dozen just prior to Gulf War
- Delivery scenarios
  - Offshore dissemination
  - Pick-up truck

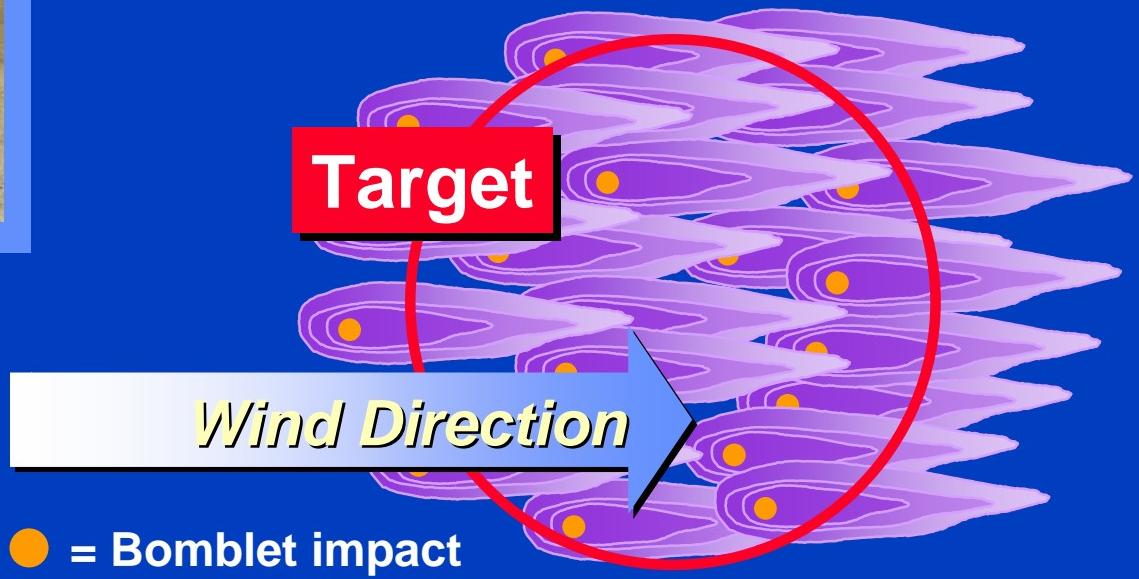
# Enemy BW Delivery Systems



Missile Warhead with Bomblets

## Threat

- Difficult to intercept
- On-target delivery of BW
- Theater or strategic weapon



## Coverage Area

SCUD-B with powdered anthrax = 50 sq. mi.

# Biological Threat in the Persian Gulf

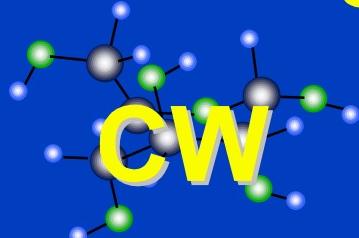
## Favorable attack conditions

- Wind speed  $\geq$  4 mps
- Atmospheric inversion
- Wind from N or NE

Line-source dissemination  
in January or February

Time	Wind Speed (mps)	Inversion	% of Time Wind N-NE
2000-0200	3.2	100	13
0300-0900	3.5	86	9
1000-1400	4.5	45	18
1500-1900	4.6	79	20

# Chemical vs. Biological Agents



Area coverage	< 10 km <sup>2</sup>	100's to 1000's km <sup>2</sup>
Quantity/km <sup>2</sup>	500 to 1000 kg	1 to 5 kg
Cost/km <sup>2</sup>	\$600	\$1
Onset time	Minutes (nerve agent) to hours (mustard)	Days (anthrax) to weeks (Q fever)
Agent form	Gas or liquid	Solid
Targets	Tactical	Rear area, theater, strategic
US preparedness	Adequate	Inadequate

# BW Force Protection

## Summary

- Reasons for enemy to use BW are compelling
- Iraq had large, weaponized stockpile
- Delivery systems: simple to sophisticated
- Threat list is diversifying
- BW causes massive casualties over large areas
- BW completely different from CW
- Successful biodetection is strongest link in biodefense chain